September 2001

Greece

Greece is an important potential transit site for energy exports from the Caspian/Caucasus regions, with limited energy reserves of its own.

Note: Information contained in this report is the best available as of September 2001 and is subject to change.

BACKGROUND

Greece is among the smallest of the economies in the European Union (EU), just larger than that of Portugal, and smaller on a per capita basis than Portugal when adjusted for purchasing power parity. Greece's industrial base is somewhat smaller than the EU average, contributing 22%-24% of GDP, but its agricultural, forestry, and fisheries sector is much larger than the EU average, at between 8.5%-10%. The state historically has played a prominent role in industry, including the energy industry, and only in recent years have significant privatizations taken place. From 1998 to mid-2000, tranches of stock in public enterprises were floated on the Athens Stock Exchange (ASE) that raised 3.5 trillion drachmas in revenue for the government. The government has generally given up only minority shares, and the prolonged slump of the ASE has put many privatizations on hold.

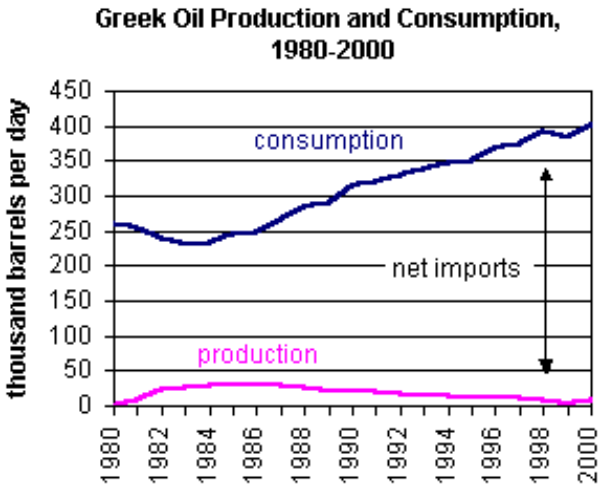
In December 2000, the Greek government released its first Stability and Growth Program, with ambitious macroeconomic targets such as 5% GDP growth for 2001, and an outline of structural reforms. The Greek economy has enjoyed fairly strong growth over the last few years, with 3.8% real GDP growth in 2000. Prior to Greece's joining of the economic and monetary union (EMU) on January 1, 2001, a depreciating drachma combined with strong growth in Greece's EU trade partners

meant a solid export market for Greece. This is now deteriorating as Greece has adopted the euro as its currency and growth levels in Greece's export markets decline. However, the country's entrance into EMU, plus associated economic reforms, are expected to make the country more attractive to foreign investors and will end exchange-rate risk with most of its major trade partners. Greece's inward stock of foreign direct investment (FDI) is low by European standards, just $22.9 billion at the end of 1999. Unemployment is likely to remain fairly high as state-owned companies restructure and privatize and public sector employment is held constant. The EU will spend 357 billion drachmas of its Community Support Framework in the next three years to support economic and social development in Greece. Greece has taken full advantage of all EU waivers ("derogations") to delay EU-mandated privatization, including energy sector privatization.

Relations between Greece and Turkey have improved recently, allowing for discussion of economic and energy cooperation. Greece is a major investor in the former Yugoslavia and its energy infrastructure is being integrated with that of the Balkan states.

OIL

Greece has limited oil reserves of 10 million barrels. The country produces 8,750 barrels per day (bbl/d) and is highly import reliant for its 401,000 bbl/d oil consumption (2000 estimates). Oil is Greece's most important fuel source, accounting for 63% of total energy consumption in 1999, a percentage that has remained fairly stable since the mid-1980s. Oil is imported primarily from Iran and Saudi Arabia. The Middle East is expected to remain the major source of Greek oil supplies, although Russia could become more important in the coming years as pipelines are constructed.



Greece's oil industry is dominated by state-owned Hellenic Petroleum (HP), which was formed in 1998 from the former state oil company, Public Petroleum Corporation (DEP). HP conducts oil exploration, imports crude and products, operates three large refineries (one in Macedonia), and distributes and markets oil products. HP has been partially privatized in stages, with the state holding 60.1% at year-end 2000. HP's initial public offering (IPO) was in June 1998, when 23% of the company was sold, to a mixture of retail and institutional investors. In August 2001, the Greek government announced its intention to sell another 30% of HP, of which two-thirds will probably be acquired by LUKoil of Russia and one-third by the Latsis Group according to a protocol signed with HP later that same month.

Greece's oil production comes from the Prinos area in the Aegean Sea, off the coast of Kavala. The Prinos fields, which began production in 1996, are operated by the U.S., Greek, and Canadian North Aegean Petroleum Company (NAPC) consortium. In February 2001, a new oilfield was found offshore the Aegean island of Thasos (also near Kavala) by Kavala Oil, with production expected to be 7,000-7,500 bbl/d. The oil will be sold to HP for refining.

HP is developing a $100-million, 143-mile pipeline to carry crude oil from the northern port city of Thessaloniki to HP's newly-acquired Okta refinery near Skopje, in the Former Yugoslav Republic of Macedonia (FYROM). Construction of the pipeline by HP's subsidiary El Pet Balkaniki began in November 1999. This pipeline will have the capacity to carry about 50,200 bbl/d. The pipeline will be managed in partnership with the FYROM, and will carry crude that currently is shipped by rail from Thessaloniki to Okta. A five-year-old plan to construct a $600-million crude oil pipeline between Burgas, Bulgaria and Alexandroupolis is progressing slowly. The Russian, Bulgarian, and Greek

governments are scheduled to meet in October 2001 to discuss the project, including possibly launching a joint-stock company. The 187-mile pipeline would allow Russia to export crude oil through the Mediterranean Sea without transiting Turkey's Bosporus and Dardenelles Straits. Greece also has discussed with Kazakhstan the possibility of shipping oil through the pipeline.

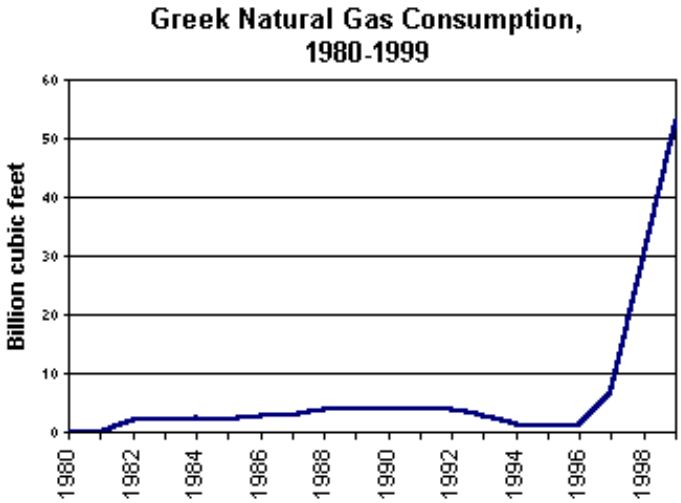
Downstream

HP owns about 57% of Greek refining capacity, with a total output of about 206,500 bbl/d. Its Aspropyrgos facility refines 140,000 bbl/d, while the Thessaloniki refinery has a 66,500-bbl/d capacity. Two private refineries, owned by Motor Oil Corinth Refineries and Petrola Hellas, are export-oriented, selling only limited volumes to the national market. Motor Oil, which had been majority-owned by Saudi Aramco, was partially sold off to Petroventure of Jersey in July 2001, a joint venture of Aramco and Vardinoyannis, which each also separately own 16.4% of Motor Oil.

HP also is the largest player in the Greek retail oil market at a 26% market share. U.S.-based Texaco and British-Dutch Royal Dutch/Shell decided in 2000 to trade Texaco's Greek retail assets for some of Shell's United Kingdom retail assets.

NATURAL GAS

With natural gas reserves of only 35 billion cubic feet (Bcf), Greece produces negligible amounts of natural gas. Consumption, however, has increased significantly over the past few years, increasing from only 1 billion cubic feet (Bcf) in 1996 to 53 Bcf in 1999. Consumption is expected to continue increasing over the coming decade, with preliminary estimates of 2000 consumption at 60 Bcf. About 80% of Greece's natural gas imports come from Russia, and 20% from Algeria.



The Greek gas industry is controlled by the state-owned Greek Public Gas Company (DEPA), which was created in 1988 in an attempt to diversify the primary energy supply by increasing the role of natural gas. DEPA is 35% owned by HP (HP will eventually be only minority-owned by the state). DEPA began importing natural gas from Russia via Bulgaria in July 1997 through a Bulgarian pipeline (Greece's only operational gas pipeline), and the company has contracts to supply natural gas to electric utilities and industrial companies. In March 2001, DEPA and Gazexport (part of Gazprom of Russia) agreed on an importation deal for 2002 which includes a 5% price increase. Under the EU Gas Directive, 20% of Greece's natural gas market was to have been opened to competition by August 2000, but Greece obtained a derogation. Under current Greek law, companies other than DEPA can only import gas to generate electric power destined for export.

Under agreements signed by DEPA, Cinergy of the United States, and Royal Dutch/Shell in July 2001, a new distribution company called EDA Attikis owned by these companies (51%, 24.9%, and 19.6%, respectively) will supply Athens and surrounding areas (30% of Greece's population). This arrangement was approved by the European Commission in September 2001. Athens was the first city to establish a gas distribution network, but at present only about 8,000 customers are connected to the network. EPA Attikis plans to invest $260 million to add 2,000 kilometers (1,243 miles) to the network in order to reach 55% of the region's population. The company expects demand of about 97 million cubic feet per day by 2020. City gas distribution networks will be built in Thessaloniki and Thessaly as well. The Italian utility company Italgas (a subsidiary of ENI) won 30-year concessions in 2000 to build and operate the two city networks, and it will have a minority stake in the network ownership and management. DEPA has the exclusive contract to supply the three distribution

networks for 15 years.

Recent improvements in Greek-Turkish relations are facilitating discussions of energy cooperation. For instance, Greece and Turkey agreed in July 2000 to work together to develop connections between their natural gas networks. This commitment was reaffirmed at "The EU and Black Sea economic cooperation conference" in September 2001 by the Turkish officials at the conference. Senior Greek and Turkish officials have signed an agreement at EU headquarters to study how best to develop natural gas connections. The two countries have agreed to work with the EU-sponsored Interstate Oil Gas Transport to Europe (INOGATE) project, which provides technical assistance to modernize oil and gas transport in central Europe and Asia in order to work toward European pipeline linkage to Caucaus and Asian oil and gas. In March 2001, Greece signed an agreement with Armenia and Iran to strengthen economic and energy cooperation. Discussions included the possibility of an EU-subsidized natural gas pipeline from Iran through either Armenia and Ukraine or Turkey and Greece.

Greece received its first liquefied natural gas (LNG) shipment in November 1999, beginning a 21-year contractual agreement between Algeria and Greece under which DEPA will purchase gas from Algeria's Sonatrach. Greece has one LNG terminal at Revithoussa, near Athens, with a capacity of 23 Bcf per year. A feasibility study is underway to determine whether to construct an underwater gas pipeline connecting Italy and Greece; if this pipeline does not come to fruition, it is possible that another LNG terminal will be constructed in Greece or that the terminal at Revithoussa will be expanded.

COAL

Lignite ("brown coal"), a brownish-black coal of low quality used almost exclusively for steam-electric power generation, is Greece's only significant fossil fuel source. Greece's lignite reserves total 3,168 million short tons (Mmst). The largest deposits are at Ptolemais and Amintaio, in northern Greece. The country has no hard coal reserves, and imports hard coal from South Africa, Russia, Venezuela, and Colombia. Domestic production has been partly opened to private companies, but the Public Power corporation is still the largest producer, as well as consumer.

ELECTRICITY

In 1999, Greece generated 46.4 billion kilowatthours (Bkwh) of electricity, 90% of which was thermal, 10% hydropower, and 1% solar (percentages do not equal 100% due to rounding). Most of the thermal is lignite-fired, with some oil-fired plants. New plants will be gas-fired for the most part. Electricity demand has been growing steadily, and medium-term predictions of growth are at 4.5% per year, meaning (according to the Energy Regulatory Authority, RAE) that some 6,000 megawatts (MW) of additional capacity will be needed to guarantee supply through 2015. Greek authorities are concerned that electrical generation capacity will be insufficient for the 2004 Olympic Games in Athens. Natural gas will become an important fuel for electricity generation as planned gas-fired plants are constructed.

The Public Power Corporation (DEH), the state-owned electricity monopoly, controls electric production, transmission, and distribution in Greece. A flotation of 20% of DEH on the Athens Stock Exchange is planned for late 2001, after operational and economic restructuring of the company is complete. In February 2001, the company lost its legal monopoly on power generation but remains the sole distributor, in accordance with the EU's Electricity Directive. Other EU member countries had to open up their electricity markets by February 1999, but Greece was granted a two-year waiver in recognition of its unique situation: it borders no other member state, and much of its territory is comprised of islands that cannot be linked into the national grid. Because it takes time to construct power plants, and because the licence tender did not close until February, it will be some time before competing generators are functioning, so DEH still has a production monopoly. At present, only customers that consume more than 100 gigawatt hours (GWh) annually (about 6,000 customers - 30% of consumption) will be able to choose suppliers. After 2005, all consumers will be able to choose

suppliers. Management of the liberalization process is the responsibility of the RAE, the Greek regulating authority. RAE received more than 900 proposals for a total of over 18,000 MW. In April 2001, RAE approved six applications for the construction of gas-fired plants with a combined capacity of 2,156 MW. ENELCO (Enel of Italy and Prometheus Gas) will build plants at Livadia and Evros, Alpha Alpha at Oinophyta, Mytilineos at Volos, HP at Thessaloniki, and Gerna Gek at Boetia. Despite these new plants, DEH still plans to have 83% of the electricity generation market in 2005. Prices for these large consumers will rise in the new competitive system, as industries are no longer subsidized by below-market electricity prices by the state.

Islands in the western part of Greece are connected to the mainland system by submarine cables. Greece is involved in a number of projects to link its electric grid with neighboring countries. Greece and Italy plan to link their grids via a cable under the Ionian Sea. Italy's ENEL has begun laying the 102-mile, 500-megawatt (MW) cable linking Otranto, Italy, and Aetos, Greece. The project is a joint venture between ENEL (75%) and PPC (25%). It is expected to be operational in 2002.

Greece's power network currently is connected with the networks of Albania, FYROM, and Bulgaria, allowing Greece to export electricity to Kosovo in Yugoslavia, through Albania and FYROM (although transmission problems in those countries have sometimes prevented much of this electricity from reaching its intended recipients). Greece has imported electricity from Bulgaria. In June 2001, energy ministers from Albania, Bosnia and Herzegovina, Bulgaria, Greece, FYROM, and Romania signed a memorandum for the creation of a competitive energy market in the Balkans.

Improved Greek-Turkish relations also are affecting the Greek electricity sector. In January 2000, a Greek-Turkish-U.S. (Copelouzos-Gama-ExxonMobil) consortium announced plans to construct a gas-fired power plant in Greece. The plant will have a capacity between 400 MW and 600 MW and will be used to export electricity to Turkey in addition to helping supply increasing Greek domestic demand. Electricity will be exported via the new 400-kilovolt (kV) transmission line to be constructed between Filippoi (Greece) and Hamidabad (Turkey).

Renewable electricity generation projects are on the rise in Greece, and the government has established the Centre for Renewable Energy Sources (CRES), under the Development Ministry, to promote renewable energy. CRES estimates that 15% of the country's electricity needs can be produced by wind farms. The EU requires that member states produce 12% of their electricity from renewable sources by 2010 (this includes hydro). There are already wind farms on a number of Greek islands and 20% of households use solar water heaters. The use of solar power in Greece reduces the need for conventionally generated energy by about 1.4 billion kilowatthours per year. The first U.S.-based independent power producer (IPP) to enter Greece provides 15,000 customers on the island of Crete with wind energy. A 50-MW parabolic trough-type solar power plant is also under construction in Crete. DEH is planning a 100-kilowatt photovoltaic (PV) park for Gavdos island, in addition to already-existing PV capability on the island. Mannheim ABB and German Windsolar signed an agreement in March 2001, to develop wind power stations in Greece. In June 2001, Gemesa of Spain signed an agreement with Hellenic Energy and Development Company to invest 420 million euros to develop wind power plants with a total capacity of 460 MW by 2005. Windforce of the UK plans to develop $800 million of projects in the EU, including three wind farms in Greece (at Makronisos, Kilkis, and Lakonia) with a total capacity of 650 MW. Energy Photovoltaics (a German-Italian-American consortium) announced in July 2001 that it will build a $22 million solar plant in Kilkis with power generation capacity of 5 MW.

COUNTRY OVERVIEW

President: Konstantinos Stephanopoulos; since May 5, 1995
Prime Minister: Konstandinos (Costas) Simitis (Panhellenic Socialist Movement - Pasok); since January 19, 1996
Independence: 1829 (from the Ottoman Empire)
Population (2001E): 10.7 million
Location/Size: Southern Europe, bordering the Aegean, Ionian and Mediterranean Seas/131,940 sq.

km. (51,146 sq. mi) ; roughly the size of Alabama
Major Cities: Athens (capital), Thessaloniki, Piraeus, Patras
Languages: Greek (official), English, French
Ethnic Groups: Greek (98%); other (2%)
Religion: Greek Orthodox (98%), Muslim (1.3%), other (0.7%)
Defense (8/98): Army (116,000), Navy (19,500), Air Force (33,000), Conscripts (112,700)

ECONOMIC OVERVIEW

Finance Minister and National Economy Minister: Mr. Ioannis Papandoniou
Currency: Drachma
Market Exchange Rate (9/19/01): US$1 = 368.64 drachmas
Nominal Gross Domestic Product (GDP, 2000E): $113 billion
Real GDP Growth Rate (2000E): 3.8% **(2001F)**: 3.9%
Unemployment Rate (2000E): 11.4% **(2001F)**: 10.7%
Inflation Rate (2000E): 3.1% **(2001F)**: 2.4%
Current Account Deficit as a % of GDP (2000E): -5% **(2001F)**: -4.7%
Major Trading Partners: Germany, Italy, other OECD Europe
Major Export Products: Manufactures, food and beverages, petroleum products
Major Import Products: Manufactured consumer goods, capital goods, crude oil, food products

ENERGY OVERVIEW

Minister of Development: Nicolaos Khristodoulakis
Proven Oil Reserves (1/1/01E): 10 million barrels
Oil Production (2000E): 8,750 barrels per day (bbl/d), of which 4,750 bbl/d is crude oil
Oil Consumption (2000E): 401,000 bbl/d
Net Oil Imports (2000E): 392,250 bbl/d
Crude Oil Refining Capacity (1/1/01E): 406,500 bbl/d
Major Crude Oil Import Sources: Persian Gulf OPEC
Natural Gas Reserves (1/1/01E): 35 billion cubic feet (Bcf)
Natural Gas Production (1999E): .07 Bcf
Natural Gas Consumption (1999E): 53 Bcf
Coal Reserves (12/31/96): 3,168 million short tons (all lignite)
Coal Production (1999E): 67.2 million short tons (Mmst)
Coal Consumption (1999E): 68.5 Mmst
Electric Generation Capacity (1999E): 9.4 gigawatts
Electricity Production (1999E): 46.4 billion kilowatthours (Bkwh)

ENVIRONMENTAL OVERVIEW

Minister of Environment, Town Planning, Public Works: Konstandinos Laliotis
Total Energy Consumption (1999E): 1.3 quadrillion Btu* (0.3% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 26.2 million metric tons of carbon (0.4% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 120.7 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.5 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 12,865 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.26 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (34.5%), Transportation (35.2%), Residential (20.9%), Commercial (9.4%)
Sectoral Share of Carbon Emissions (1998E): Industrial (39.2%), Transportation (27.5%), Residential (21.5%), Commercial (11.8%)
Fuel Share of Energy Consumption (1999E): Oil (63.0%), Coal (28.7%), Natural Gas (4.2%)
Fuel Share of Carbon Emissions (1999E): Oil (60.2%), Coal (36.8%), Natural Gas (3.0%)
Renewable Energy Consumption (1998E): 93 trillion Btu* (2% decrease from 1997)

Number of People per Motor Vehicle (1998): 3.1 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified August 4th, 1994). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, but not yet ratified), Greece has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: Air pollution and water pollution.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94 and Wetlands. Has signed, but not ratified, Air Pollution-Persistent Organic Pollutants, Air Pollution-Volatile Organic Compounds.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

OIL AND GAS INDUSTRIES

Organization: Hellenic Petroleum -- the state petroleum company; DEPA -- the state-controlled gas company; Public Power Corporation - the state-owned utility
Major Refineries (capacity - bbl/d, 1/1/01E): HP Aspropyrgos (140,000), Motor Oil Aghii Theodori (100,000), Petrolas Hellas Elefsis (100,000), HP Thessaloniki (66,500)
Major Ports: Piraeus,Thessaloniki, Patras

Sources for this report include: CIA World Factbook 1999; Dow Jones News wire service; Economist Intelligence Unit ViewsWire; Financial Times; Oil and Gas Journal; Petroleum Economist; International Market Insight Reports; DRI McGraw-Hill Companies, Global Power Report; CNN Interactive; National Trade Data Bank; Petroleum Intelligence Weekly; U.S. Energy Information Administration; WEFA World Economic Outlook.

Links

For more information on Greece, see these other sources on the EIA web site:
EIA Data for Greece
European Union Fact Sheet

Links to U.S. government other sites:
CIA World Factbook, Greece
U.S. Department of Energy's Office of Fossil Energy's International section, Greece
U.S. Department of State Consular Information Sheet, Greece
U.S. Embassy and U.S. Information Agency, Athens, Greece

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Renewable Energy Distributors in Greece

The Greek Connection
Greek Government online
Greek Government information
European Regional Development Fund and Cohesion Fund
European Commission Directorate General for Energy and Transport
European Commission Directorate General for Environment
European Commission Directorate General for the Internal Market
EU Council, Economic Policy Coordination
International Energy Agency (follow links to 1998 review of Greece)
Hellenic Petroleum (HP)

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